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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/702,238	11/06/2003	Bradley J. Howard	97-0008.02	7948

7590 01/04/2006

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EXAMINER
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LEE, SIN J

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 01/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/702,238		HOWARD, BRADLEY J.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Sin J. Lee		1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 October 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 55-61 and 76-87 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 55-61 and 76-87 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### ***Claim Rejections - 35 USC § 102***

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claims 55-61, 76-78, and 82-87 are rejected under 35 U.S.C. 102(e) as being anticipated by Naik et al (US 6,204,168 B1).

In col.3, lines 16-27, Naik states the following:

To form a single damascene structure, a first layer of low k material is deposited upon a substrate and a layer of PPMS (or another silicon-based resist material) is deposited upon the layer of low k material. The PPMS is then masked and exposed to UV light to form PPMSO at the exposed regions of the mask. A chlorine etch chemistry is used to remove the PPMS and form a patterned layer of PPMSO. The pattern defines locations for vias through the first layer of low k material. An oxygen-based etch chemistry is then used to remove the low k material at the via location. As such, the patterned layer of PPMSO is used as a hard mask during the oxygen-based etch process.

Naik also teaches (col.8, lines 48-53) that the single damascene structure utilizes the PPMSO as an etch stop and a hard mask type material for etching the low k polymers within an oxygen plasma. Since PPMSO is being exposed to the environment of oxygen plasma, it is the Examiner's position that Naik's PPMSO layer would further convert to an oxide layer through the oxygen plasma (present claim language does not exclude present insulative layer being an oxide layer). Naik furthermore teaches (col.3, lines 28-30) that a metallization layer is deposited over the via pattern and the layer is planarized such that only the via is filled with metallization. Therefore, the prior art teaches present inventions of claims 55-61, 76-78, and 82-87.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 79-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naik et al (US 6,204,168 B1) in view of Weidman et al (5,885,751).

As described above in Paragraph 4, Naik etches the low k polymers within an *oxygen plasma* (by which Naik's PPMSO will convert to oxide). Although Naik does not explicitly mention "annealing", it is very well known in the art, as evidenced by Weidman, col.1, lines 12-38, to oxidize *and anneal* the PPMSO pattern to convert it to a hard oxide suitable for further processing (such as deposition or etching steps). Therefore, it would have been obvious to one skilled in the art to oxidize and anneal

Naik's PPMSO pattern in order to convert it to a hard oxide suitable for further processing. Therefore, Naik in view of Weidman would render obvious present inventions of claims 79-81.

***Response to Arguments***

6. Applicants argue that Naik does not provide disclosure as to further converting the PPMSO layer that results from UV radiation to an oxide layer through exposure to an oxygen plasma. However, as discussed above, since the PPMSO layer is being subject to an oxygen plasma environment, it is the Examiner's position that the PPMSO would inherently further convert to an oxide layer within the oxygen plasma environment. Present claim language does not prevent present insulative layer being an oxide layer.

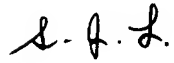
7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

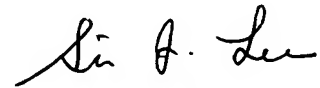
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



S. Lee  
December 27, 2005



**SIN LEE**  
**PRIMARY EXAMINER**